

What is claimed is:

1 1. A fuel cell electrode comprising:

2 a plate having a front surface and a back surface and
3 also having a plurality of gas delivery holes and a plurality
4 of gas exhaust holes formed through the plate, the front
5 surface of the plate having a plurality of open gas
6 distributions channels, a first portion of which is connected
7 at one end to a first one of the plurality of gas delivery
8 holes and at another end to a first one of the plurality of
9 gas exhaust holes, a second portion of which is connected at
10 one end to a second one of the plurality of gas delivery holes
11 and at another end to a second one of the plurality of gas
12 exhaust holes, and a third portion of which is connected at
13 one end to said second one of the plurality of gas delivery
14 holes and at another end to said first one of the plurality of
15 gas exhaust holes.

1 2. The fuel cell electrode of claim 1 wherein the plate
2 includes an equal number of gas delivery holes and gas exhaust
3 holes.

1 3. The fuel cell electrode of claim 1 wherein the plate
2 includes two gas delivery holes and two gas exhaust holes.

1 4. The fuel cell electrode of claim 1 wherein the
2 portions include a plurality of open gas distribution
3 channels.

1 5. The fuel cell electrode of claim 1 further
2 comprising a second plate having a front surface and a back
3 surface and also having a plurality of air delivery holes and
4 a plurality of air exhaust holes formed through the second
5 plate, the back surface of the second plate having a plurality

6 of open air distributions channels, a first portion of which
7 is connected at one end to a first one of the plurality of air
8 delivery holes and at another end to a first one of the
9 plurality of air exhaust holes, a second portion of which is
10 connected at one end to a second one of the plurality of air
11 delivery holes and at another end to a second one of the
12 plurality of air exhaust holes, and a third portion of which
13 is connected at one end to said second one of the plurality of
14 air delivery holes and at another end to said first one of the
15 plurality of air exhaust holes.

1 6. The fuel cell electrode of claim 5 wherein the
2 second plate includes an equal number of air delivery holes
3 and air exhaust holes.

1 7. The fuel cell electrode of claim 5 wherein the
2 second plate includes two air delivery holes and two air
3 exhaust holes.

1 8. The fuel cell electrode of claim 5 wherein the
2 portions include a plurality of open air distribution
3 channels.

1 9. The fuel cell electrode of claim 1 wherein the front
2 surface serves as an anode side of the plate.

1 10. The fuel cell electrode of claim 1 wherein the front
2 surface serves as a cathode side of the plate.

1 11. A fuel cell system comprising:
2 a plurality of fuel cells stacked together, each having a
3 first electrode, a second electrode, and a membrane sandwiched
4 between the first and second electrodes, wherein each first

5 electrode includes a plurality of gas distribution channels on
6 a surface thereof;

7 a plurality of gas delivery manifolds, each of which is
8 connected to the plurality of channels of each of the
9 plurality of first electrodes; and

10 a plurality of gas exhaust manifolds, each of which is
11 connected to the plurality of channels of each of the
12 plurality of first electrodes, wherein on the first electrode
13 of each of the plurality of fuel cells, a first portion of the
14 plurality of gas distribution channels is connected at one end
15 to a first one of the plurality of gas delivery manifolds and
16 at another end to a first one of the plurality of gas exhaust
17 manifolds, a second portion of the plurality of gas
18 distribution channels is connected at one end to a second one
19 of the plurality of gas delivery manifolds and at another end
20 to a second one of the plurality of gas exhaust manifolds, and
21 a third portion of the plurality of gas distribution channels
22 is connected at one end to said second one of the plurality of
23 gas delivery manifolds and at another end to said first one of
24 the plurality of gas exhaust manifolds.

1 12. The fuel cell system of claim 11 wherein the fuel
2 cell system includes an equal number of gas delivery manifolds
3 and gas exhaust manifolds.

1 13. The fuel cell system of claim 11 wherein the fuel
2 cell system includes two gas delivery manifolds and two gas
3 exhaust manifolds.

1 14. The fuel cell system of claim 11 wherein the
2 portions include a plurality of gas distribution channels.

1 15. The fuel cell system of claim 11 further comprising
2 a gas delivery valve connected to an outermost one of the
3 plurality of fuel cells and configured to open and close over
4 a portion of the plurality of gas delivery manifolds.

1 16. The fuel cell system of claim 11 further comprising
2 a gas exhaust valve connected to an outermost one of the
3 plurality of fuel cells and configured to open and close over
4 a portion of the plurality of gas exhaust manifolds.

1 17. The fuel cell system of claim 11 further comprising:
2 a plurality of air delivery manifolds, each of which is
3 connected to a plurality of air distribution channels on a
4 surface of each of the plurality of second electrodes; and
5 a plurality of air exhaust manifolds, each of which is
6 connected to the plurality of air distribution channels of
7 each of the plurality of second electrodes, wherein on the
8 second electrode of each of the plurality of fuel cells, a
9 first portion of the plurality of air distribution channels is
10 connected at one end to a first one of the plurality of air
11 delivery manifolds and at another end to a first one of the
12 plurality of air exhaust manifolds, a second portion of the
13 plurality of air distribution channels is connected at one end
14 to a second one of the plurality of air delivery manifolds and
15 at another end to a second one of the plurality of air exhaust
16 manifolds, and a third portion of the plurality of air
17 distribution channels is connected at one end to said second
18 one of the plurality of air delivery manifolds and at another
19 end to said first one of the plurality of air exhaust
20 manifolds.

1 18. The fuel cell system of claim 17 wherein the fuel
2 cell system includes an equal number of air delivery manifolds
3 and air exhaust manifolds.

1 19. The fuel cell system of claim 17 wherein the fuel
2 cell system includes two air delivery manifolds and two air
3 exhaust manifolds.

1 20. The fuel cell system of claim 17 wherein the
2 portions include a plurality of air distribution channels.